

Library deficiencies

D. Brown, National Nuclear Data Center, BNL



U.S. DEPARTMENT OF
ENERGY

Office of
Science

ENDF/B Quality Assurance

Pen-n-paper “Days of yore”
(pre-2011)

Automated with ADVANCE
(2011-present)

ENDF/B Evaluation Review

Material: 239Pu Library: 1.2 MAT #: 1325 Date rec'd: 7/13/02
Evaluator: P. Young Assigned to: Yong Gao

Comments:
Phase I Reviewers: Debbie M. Pyle

(Check off operations below as completed)	Initials	Date
<input checked="" type="checkbox"/> Copy onto disk: SA2:[ENDF.NEW] <u>At 2.1.1.A.1.1</u>	<u>ZM</u>	<u>7/14</u>
<input checked="" type="checkbox"/> List: <input type="checkbox"/> entire file or <input checked="" type="checkbox"/> file 451 comments.	<u>PD</u>	<u>8/2/02</u>
<input checked="" type="checkbox"/> Run checking code: PRECHK P1 P2 P3 P1=working area, P2=file_name, P3=file ext. Check output listing (P2.CHK) before proceeding.	<u>PD</u>	<u>8/2/02</u>
<input type="checkbox"/> Error(s) found. <input checked="" type="checkbox"/> File corrected. (See listing on back).	<u>AK</u>	<u>8/2/02</u>
<input checked="" type="checkbox"/> Run 2nd pass checking: KIT P1 P2 P3 P1=working area, P2=file_name, P3=REL8 Listings: P2.CHK, + 2 copies each P2.FIZ, J.LST, PSY	<u>ZM</u>	<u>8/2/02</u>
<input type="checkbox"/> Error(s) found. <input checked="" type="checkbox"/> File corrected; kit rerun. (See listing on back).		
<input checked="" type="checkbox"/> Process data for plotting: KDOP P1 P2 P3 P1=working area, P2=file_name, P3=REL8 Produces pointwise data file (tmp:P2.DPW) Produces listing of thermal and 14-Mev values (P2.DGT.LST)	<u>ZM</u>	<u>8/25</u>
<input checked="" type="checkbox"/> Plot vs. experimental data and other evaluations. (See Data Preparation Form). <input type="checkbox"/> ENDF/B <input checked="" type="checkbox"/> JEF <input type="checkbox"/> JENDL <input type="checkbox"/> BROND <input type="checkbox"/> CENDL (See Data Preparation Form).	<u>GM</u>	<u>8/25</u>
<input type="checkbox"/> Prepare review kit including plots, listings, and forms.		
Sent to Phase I reviewer(s).	<u>ZM</u>	<u>8/29</u>
Phase I review kit returned from:		
Date: _____		
Date: _____		

ENDF/B Evaluation Review Form (ENDF/B-7.0) (P100000)

Sample PHASE I review packet cover page (June 2000)

ADVANCE: The ENDF Continuous Integration System

ENDF B-VII.dev

ENDF/B Development

The development version of the Evaluated Nuclear Data File (ENDF/B)

Latest Updates

- Sublibrary release: neutrons
- Project: sublib, release notes on neutrons generated. The result was a SUCCESS
- 2013-04-30 16:47:38 001872

Sublibrary release: neutrons

Project: sublib, build on neutrons generated. The result was a SUCCESS- 2013-04-30 16:47:38 001872

Sublibrary release: neutrons

Project: sublib, release notes on neutrons generated. The result was a SUCCESS- 2013-04-30 16:47:38 001872

Neutrons

Decay

Charged particles

Photonuclear

Atomic

Neutrons sublibraries

- Neutrons Sublibrary
- Neutron-induced Reaction
- Standard Sublibrary
- Thermal Neutron Scattering Sublibrary

Build time: 2013-04-30 16:52:01.324262

Labels: neutrons.lib

Database name: neutrons-neutrons.lib

Forge Links:

- Browse
- Download sublibrary folder

<http://www.nndc.bnl.gov/endl/b7.dev/qa/index.html>

Where to find the link to ADVANCE

www.nndc.bnl.gov

Reactions tab

The link

The screenshot shows the NNDC website interface. A red arrow points to the URL www.nndc.bnl.gov. A red box highlights the 'Reactions' tab in the navigation bar. A red arrow points to the 'ADVANCE' link in the 'Evaluated ENDF data' section. A red box highlights the 'ADVANCE' link. A red arrow points to the 'ADVANCE' link. A red box highlights the 'ADVANCE' link.

www.nndc.bnl.gov

Reactions tab

The link

ADVANCE

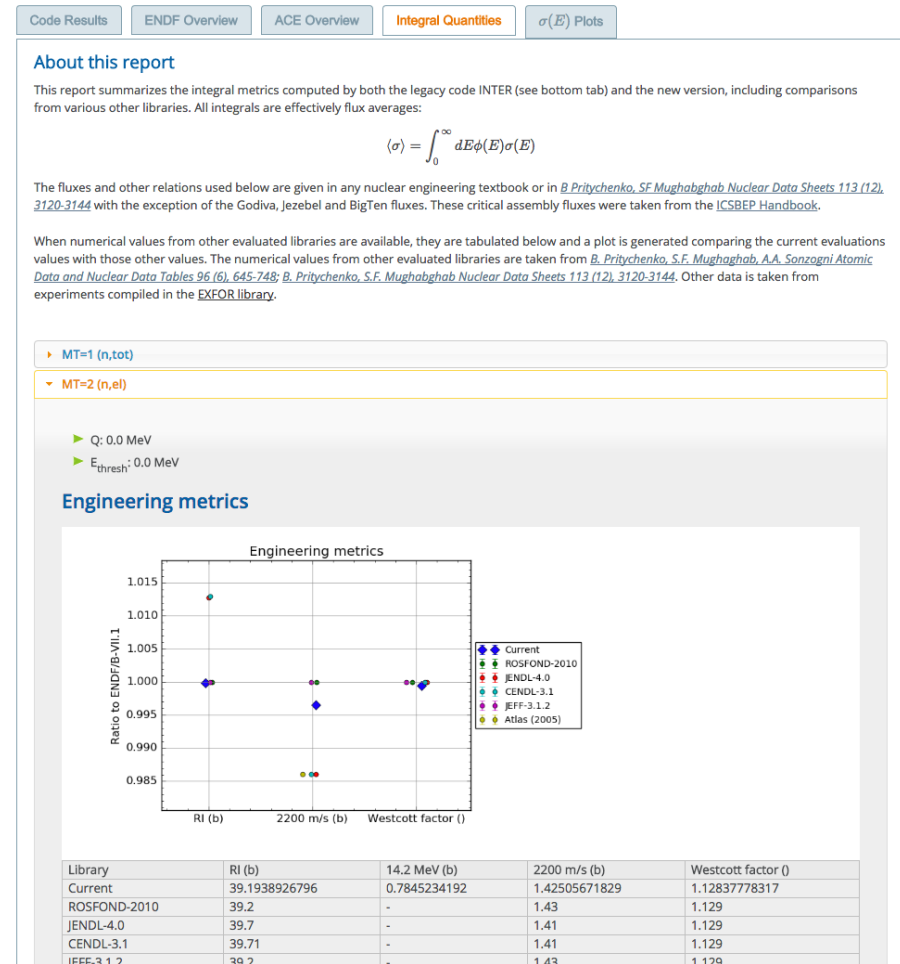
ADVANCE quality assurance system for ENDF

■ On every commit of every evaluation automatically:

- Run it through a battery of tests, including customer codes
- Generate comparison plots
- Generate HTML report

■ New in FY17:

- Update Fudge-4.2.1 add PREPRO/GROUPIE
- Aesthetic improvements (AJAX & MathJax)
- Full library ACE file tarballs
- Per-isotope error reports
- Covariance and ACE overview
- Rewrote INTER using FUDGE



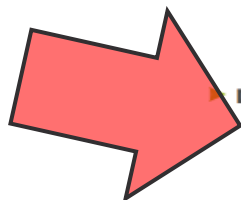
To find out detailed lists of problems, go to ADVANCE, find your library's release notes

The ADVANCE Continuous Integration System

BROOKHAVEN
NATIONAL LABORATORY



The link



Neutrons Sublibrary

ENDF/B Development Library

General Information:

- ▶ ENDF sublib designator: 10
- ▶ **Revision Number:** 1063:1064M
- ▶ **Last Modified Revision:** 741:1064M
- ▶ **Build Status:**
 - ▶ Build status: [ERROR](#)
 - ▶ Build time: 2017-02-09 19:03:04.220288

Downloads:

- ▶ Release Notes: [neutrons-releaseNotes.pdf](#)
- ▶ Listfile: [neutrons.list](#)
- ▶ Release Tarball: [neutrons.tar.gz](#)
- ▶ ACE File Tarball: [neutrons-aceFiles.tar.gz](#)

GForge Links:

- ▶ Browse [SVN](#)
- ▶ Browse sublibrary [tracker](#)

Latest Updates

Many big problems exist that require new evaluations

- See neutron and CSEWG trackers
- Many other cases we can handle...

Common Problems

- ENDF header needs update for ENDF/B-VIII:
 - Mod numbers
 - Dates
 - Directory
 - ...
- This will clean up ~1/2 of all errors reported by processing and checking codes

Atomic Problems

- atomic_relax: LIST records confused, all actinides (FIZCON bug or real issue?)
- photoat: all reactions use two-body kinematics, but not in CM frame (FUDGE bug or real issue?)
- electrons: FUDGE unimplemented something

Charged Particle Problems

- Energy ranges not in sync
- QM, QI problems (electrons included or not?)
- $P(\mu|E)$, $P(\mu, E'|E)$ not normalized correctly
- Negative probabilities and/or multiplicities
- 1 incorrect MAT assignment (p+9Be)
- 2-body kinematics specified incorrectly (p+d, p+13C)
- Incorrect primary gamma (p+d)
- Discrete levels out of order (d+t)
- d+t uses N-body phase space for MT=51

Decay Problems

- Too many damn isotopes, go look at notes

FPY Problems

- Incorrect MAT assignments
- ^{241}Pu hole in rare earths
- ^{84}mAs doesn't exist
- IFPY > CFPY for ^{239}Pu

Neutron Problems (1/2)

- Energy ranges not in sync
- QM, QI problems (electrons included or not?)
- $P(\mu|E)$, $P(\mu, E'|E)$ not normalized correctly
- Negative probabilities and/or multiplicities
- Occasional NaN in PURR tables (NJOY)
- Missing continuum gammas (many instances)
- Stupid punchcard related format errors (^{58}Ni , ^{60}Ni , ^{16}O , ^{182}W)
- Q vs. Ethresh (^{16}O , ^{93}Nb)

Neutron Problems (2/2)

- Outgoing ZA wrong (d, 93Nb, all W)
- Negative RRR width (231Pa)
- Log(0) (124Sn, 122Sn)
- Duplicate E' (many)
- Check fission energy release/fission Q (239Pu, 231Pa, 233Pa, 237U, 239U, 241U)
- Gamma BR (all Hf)
- Sum rules not obeyed (many)
- Elevel in gammas != cross sections (enough to cause heartburn)
- Primary gamma has too much energy (natC, 12C)

Photonuclear Problems

- Energy ranges not in sync
- QM, QI problems (electrons included or not?)
- $P(\mu|E)$, $P(\mu, E'|E)$ not normalized correctly
- Negative probabilities and/or multiplicities
- Missing nubar and/or LFI incorrect (^{232}Th , ^{233}U , ^{234}U , ^{236}U , ^{238}Pu , ^{241}Pu)
- E' too big (^{234}U , ^{236}U , ^{238}Pu , ^{241}Pu)
- Missing spectra (many)
- Kalbach-Mann parameters off (^{13}C , ^{14}N , ^{17}O , ^{206}Pb , ^{207}Pb)
- ^{40}Ca mass different here
- (g,n) listed as MT=5

TSL Problems

- See next pages

TSL Library Action Item from Nov 2016

- Temperature interpolator for LEAPR module (Python scripts with XML intermediate files drive NJOY/LEAPR); **QUESTION: is it possible to post interpolator on-line?** **QUESTION: is it possible to release LEAPR inputs for H2O?** **FIX: Yes, and though BNL in the not to distant future.** NNL need them for licensing
- **ACTION: BNL make system for storing LEAPR inputs associated with ENDF files**
- LEAPR files available for all TSL evaluation except benzene
- Enabled set of checks from I. Marquez-Damien & D. Roubtsov)

TSL checks from (I. Marquez-Damien & D. Roubtsov)

1. Check (if possible, from the documentation and/or LEAPR inputs) if the evaluation is given for a nuclide, element or compound;
2. Compare $M0*f0$ from MF7/MT4 with the reconstructed value from RECONR/BROADR at 0 K (B(1), B(6) consistency check);
3. Check that MAT corresponds to the new values in ENDF-102, app. C;
4. Check that ZAID follows the new guidelines given in ENDF-102, app. C;
5. Check that the provided LEAPR inputs run in NJOY2016.

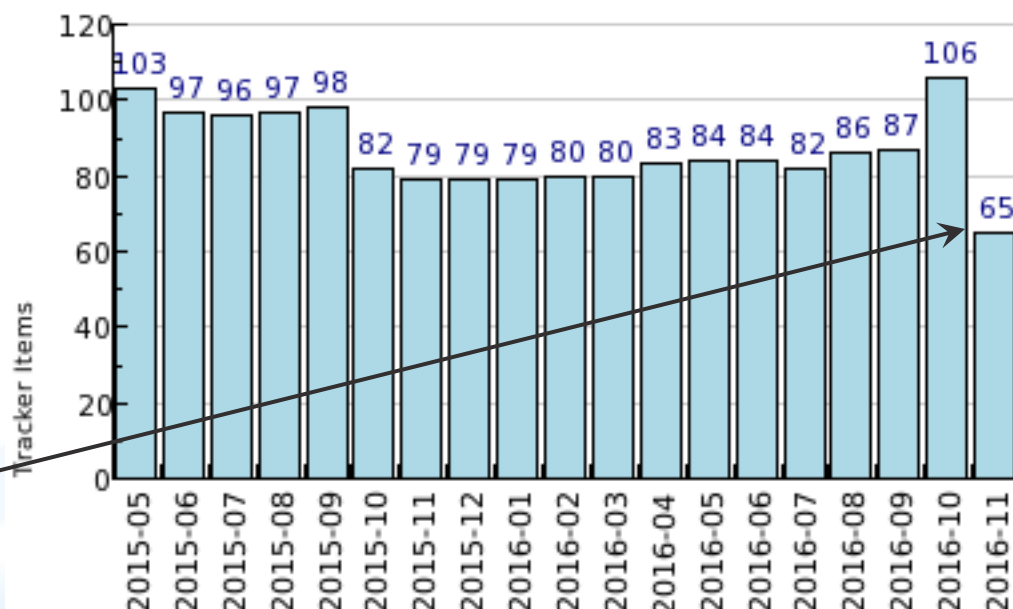
ENDF Hackathon© 2016



- **Participants (9/2016):** D. Brown, T. Kawano, S. Mughabghab, G. Nobre, V. Sobes, I. Thompson (remotely)
- **Clean up as many ENDF evaluations as possible using whatever evaluation tools you have**
- **Donuts and coffee provided...**
- **Schedule:**
 - M-Th — kill bugs
 - F — review changes, make sure OK

40% reduction
in open trackers

Tracker Items That Remained Open In Each Month



ENDF Hackathon© 2016



- **Participants (9/2016):** D. Brown, T. Kawano, S. Mughabghab, G. Nobre, V. Sol

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- **Donu**
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- **Sched**

- M-T
- F — review changes, make sure OK

40% reduction
in open trackers

Do we need one
this year?

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n Each Month

